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ABSTRACT

Characteristics of foreign national enrollments in colleges and universities in the U.S. Mid-South are discussed, along with implications of the presence of foreign nationals for colleges and the U.S. labor market. Enrollments of foreign nationals by field of study in 1982 are examined, along with their representation at the graduate level in science and engineering. Data are also provided on: enrollments by state and by type of institution (public and private, two- and four-year); the percentage of U.S. degrees awarded to foreign nationals in four selected disciplines; the percentage of foreign nationals who received U.S. science and engineering degrees during 1976-1979 who were in the U.S. work force in 1982 by five disciplines; and foreign nationals as a percentage of all Ph.D. new entrants into the U.S. labor force, 1980-1981, by four disciplines. Highlights are as follows: (1) 1982 and 1984 foregin student enrollments in Alabama, Arkansas, Kentucky, Louisiana, Mississippi, and Tennessee increased at a greater rate than for the nation as a whole; (2) Louisiana has a much larger percentage of foreign students than expected; and (3) many of the foreign nationals trained in U.S. colleges enter the U.S. labor market. (SW)

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FOREIGN NATIONAL STUDENTS AT COLLEGES AND UNIVERSITIES IN THE UNITED STATES AND IN THE MID-SOUTH: BOON OR BANE?

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Paper presented at the 1985 Annual Meeting of the Mid-South Educational Research Association, Biloxi, Mississippi, November 6, 1985.

ISSUES AT THE NATIONAL LEVEL

The Institute of International Education estimated that there were over 342,000 foreign nationals enrolled in U.S. colleges and universities during the academic year 1984-1985 (Evangelauf, 1985). Their number has been steadily increasing--more than doubling in each of the past three decades (Boyan, 1984).

Although they still represent a small percentage of the twelve-and-one-half million students enrolled overall, foreign nationals account for a significant proportion of students enrolled in many fields of science and engineering (See Tables 1 and 2). Likewise, they receive a considerable number of all U.S. degrees awarded in these areas, especially graduate degrees (See Figure 1). Graduate degree awards to U.S. citizens are declining in these same fields at a time when domestic demand for many specialties (e.g., electrical and electronic engineering, computer science) is increasing (Clark, Howard, Stevenson, & Trice, 1985; U.S. Department of Energy, in press). Over half of the Ph.D.'s granted in some "high-demand, high-tech" fields are going to foreign nationals (Finn, 1985). These trends have raised difficult issues for educational decision-makers and constituents at all levels.

A growing concern among politicians and the popular press is the export of American technology to foreign countries which may or may not have goals and interests compatible with those of this country. This transfer may take place not only through the export of sophisticated computer hardware and other high-tech goods themselves, but also through the return of foreign nationals to their homelands, having been trained in U.S. colleges and universities to use, design, and produce these goods. Thus, concerns about national security have led to proposals to limit the access of these students to such technology.

Recently, the presidents of 17 leading scientific societies (including the American Association for the Advancement of Science, the American Chemical Society, the American Physical Society, and the Institute of Electrical and Electronic Engineers) sent a letter to Secretary of Defense Caspar Weinberger, objecting to the Department of Defense's efforts to control attendance at sessions in professional meetings in which the research presented is unclassified but contains information which DOD considers "sensitive" (e.g., research on laser technology). Although the letter elicited a statement by

President Reagan that "It is the policy of this Administration that, to the maximum extent possible, the products of fundamental research remain unrestricted," many university and society officials still feel that the statement leaves too many uncertainties and ambiguities (Coughlin, October 2, 1985, October 9, 1985).

Each year state legislators and/or administrators and governing boards of publicly supported colleges and universities struggle with setting the tuition surcharge for out-of-state students (including foreign nationals, who might be considered the ultimate out-of-state students). One element of the philosophy underlying this two-tiered tuition structure is that the state is less likely to benefit from the future efforts of out-of-state students, because they are more likely to leave the state after graduation; therefore, they should pay a greater portion of the real cost of their education (i.e., the state should not subsidize their education to the extent that they subsidize that of probable future resident taxpayers).

Also, because high-demand, high-tech curricula are typically more expensive to offer and more difficult to attract and retain highly-qualified instructional personnel for, enrollment limits are sometimes necessitated by the resources available. This has led some to question the equity of a public institution's displacing a qualified in-state student (or U.S. citizen) in favor of an outstanding out-of-state student (or foreign national). Others have argued that the reason that foreign nationals constitute such a large proportion of students in these "difficult" disciplines is simply that they are more proficient in them than American college students in general, and that substituting American nationals for foreign nationals would adversely affect the overall quality of the pool of graduates (Wilson, 1985).

Policy-makers at all levels are apprehensive that U.S. colleges and universities are educating foreign nationals who eventually will fill high-paying positions in this country that American citizens might otherwise secure. This fear has led to recommendations to restrict the ability of foreign nationals to work in this country after graduation (Clark et al., 1985; Finn, 1984).

It is evident, then, that the increasing numbers of foreign nationals who attend colleges and universities in this country have raised questions that cannot be ignored: Are they "stealing" our technology, to be later used against us--economically or even militarily--after they return home? Do they represent

an unfair burden on the taxpayers who support public education, because they return to their countries of origin to enter the labor market, never becoming U.S. taxpayers? Are they displacing Americans in high-demand, high-tech academic programs and occupations? When they do remain in the United States to work, are they depressing the salaries of U.S. workers in science and engineering fields by demanding lower salaries than their U.S. counterparts? Before turning to these questions, let us first examine the characteristics of foreign national enrollments in the colleges and universities in the Mid-South.

FOREIGN NATIONALS IN COLLEGES AND UNIVERSITIES IN THE MID-SOUTH

Table 3 summarizes the enrollment of foreign nationals in the Mid-South in 1982 and 1984. Note that the number of these students increased among these six states at a greater rate than for the United States as a whole. This is consistent with a twenty year trend which has seen the South account for a growing proportion of foreign students, relative to other regions of the country.

The raw numbers contained in Table 3 can perhaps be put into better perspective by examining Figure 2, which shows the foreign national component of enrollment in each of these six states, as well as that for total enrollment and graduate science and engineering enrollment (The proportion of graduate science and engineering enrollment is shown, since foreign nationals represent such a disproportionate percentage of this group nationally). The states which comprise the Mid-South "house" over 7 percent of all college and university students in the United States, but only about five-and-one-half percent of all graduate science and engineering students and about six-and-one-half percent of all foreign students. In Figure 2, the differences in the heights between the first bar and the second and third bars within each state represent departures from the national profile (i.e., if there were no difference between the characteristics of foreign national or graduate science and engineering enrollments in a state and those for the country as a whole, all three bars would be the same height). It is interesting to note that Louisiana has a much larger percentage of foreign students than one would expect; in fact, it ranks eighth nationally in the number of foreign students, compared to twenty-second in terms of total number of students (Boyan, 1984; "Fall Enrollment," 1985; National Science Foundation, 1985).

The distribution of these foreign students between 2-year and 4-year, and between public and private institutions is reflected in Table 4. Again, there are wide variations among states. A significantly smaller proportion of foreign nationals are enrolled in private institutions in the Mid-South than in the United States in the aggregate. Further, there are proportionately fewer foreign students enrolled in 2-year institutions in the Mid-South than in those in the country as a whole.

In general, then--with a few notable exceptions--patterns of foreign student enrollment in the Mid-South are not too different from those of the rest of the country. The same concerns being expressed nationally which relate to these individuals are, therefore, just as important to decision-makers in the Mid-South as to those at the national level--perhaps even more so, as we shall see later.

IMPLICATIONS OF FOREIGN NATIONALS ON THE U.S. LABOR MARKET

Many concerns about the education of foreign nationals in U.S. colleges and universities relate to the traditional "brain drain" issue (i.e., the flow of talented and educated individuals from other countries to the United States), and its converse, the use of domestic resources to educate individuals who take that know-how to other countries, thereby depriving this country of the benefit of their training. Other concerns center around the overdependence of U.S. industry on foreign-born workers, especially those with graduate training in high-demand, high-tech specialties, presumably to the detriment of U.S. citizens who might otherwise fill these positions.

Recent studies have revealed that many of the foreign nationals who are trained in U.S. colleges and universities either remain in this country to work after their graduation or return to the U.S. to work after a short stay at home (See Figure 3). This is particularly true in high-demand occupations such as engineering and computer science. Fully three-fourths of all foreign nationals who received U.S. degrees in mathematics and computer science during the period 1976-1979 were in the U.S. labor force in 1982 (Finn, 1984). Again, this is particularly true for individuals with advanced training in high-demand, high-tech fields. In a recent year, over a third of the doctoral-level scientists and engineers with degrees in engineering or computer science who entered the

U.S. labor market for the first time were foreign nationals. There is no evidence to support the contention that foreign nationals earn lower salaries than U.S. scientists and engineers of similar age and experience (Finn, 1985).

Senator Ted Kennedy has argued that high-tech firms in Massachusetts would suffer if they could not hire foreign graduates of U.S. universities. Representatives of colleges and universities have insisted that they, too, need to be able to hire foreign nationals to staff unfilled positions in some of the high-demand disciplines in which there are nationwide shortages ("Engineering Community Still Split," cited in Finn, 1984).

It can be surmised, therefore, that conscientious efforts by colleges and universities to diminish the number of foreign nationals enrolled in "sensitive" high-tech programs could prove to be a two-edged sword. Such efforts would probably help limit the export of American technology. The fact that foreign nationals comprise a significant portion of the qualified domestic work force in high-tech specialties, however, strongly suggests that such protectionism ultimately would be deleterious to the integrity of American technology and a threat to its expansion.

IMPLICATIONS FOR COLLEGES AND UNIVERSITIES IN THE MID-SOUTH

It has been argued that U.S.-educated foreign nationals are an integral part of the current American work force in advanced technology. As such, they are assets to the economy and contributors to the growth of scientific and technological knowledge. The likelihood that this will continue to be the case for the forseeable future holds much promise for colleges and universities in the Mid-South.

The number of foreign nationals attending school in the United States is still growing each year. In addition, an increasingly larger proportion of them choose to attend colleges and universities in the South. During a period of generally declining enrollments and contracting public funds for higher education, foreign nationals represent a growing pool of potential students. It would behoove legislators and college and university administrators, therefore, to try to determine <u>why</u> some choose to attend schools in the South rather than in some other part of the country. Why does Louisiana have such a large proportion compared to other schools in the Mid-South, for example? Perhaps more

direct efforts on the part of states and individual institutions to attract students from specific countries are in order. A thorough examination of the varying levels and underlying philosophies of two-tiered tuition structures might also be in order.

In short, the growing number of foreign nationals who are attending U.S. colleges and universities, together with the increasing dependence on them to fill high-demand, high-tech occupations, present a unique "window of opportunity" for institutions of higher education to foster a mutually beneficial relationship with this component of American society. This may be especially true for institutions in the South, and, because the potential rewards are great, it is an area which merits increasing attention.

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TABLE 1. ENROLLMENT OF FOREIGN NATIONALS BY FIELD OF STUDY, ALL ACADEMIC LEVELS, 1982

Field of Study	Total Enrollment of Foreign Nationals	% of All Foreign Nationals
Engineering	77,990	23.1%
Business & Management	60,960	18.1
Physical & Life Sciences	26,830	8.0
Mathematics & Computer Science	25,680	7.6
Social Sciences	23,910	7.1
Fine & Applied Arts	15,510	4.6
Education	12,260	3.6
Humanities	11,990	3.6
Health Sciences	11,970	3.6
Agriculture	8,540	2.5
Other	22,160	6.6
Intensive English Language	13,610	4.0
Undeclared	25,580	7.6
Total	336,990	100.0

Source: Extracted from data in Institute of International Education, *Open Doors: 1982/83*, 1984, p. 34.

TABLE 2. FOREIGN NATIONAL SCIENCE AND ENGINEERING GRADUATE STUDENTS AS A PERCENTAGE OF TOTAL ENROLLMENT, 1982

Field	% of Full-Time Enrollment	% of Part-Time Enrollment	% of Total Enrollment
Engineering	42.6%	10.6%	29.3%
Physical Sciences	27.0	11.1	24.6
Mathematics & Computer Science	35.1	10.7	23.9
Agricultural Sciences	24.0	8.9	21.0
Environmental Sciences	14.3	5.8	12.2
Biological Sciences	13.6	6.2	12.0
Social Sciences	14.6	5.3	11.0
Health Sciences	10.0	3.5	6.9
Total S&E's	22.7	7.3	17.2

Source: Based on data contained in *Academic Science/Engineering: Graduate Enrollment and Support, Fall 1982* from National Science Foundation.

TABLE 3. ENROLLMENT OF FOREIGN STUDENTS IN THE MID-SOUTH AND IN THE U.S., 1982 AND 1984

State	1982 Foreign Student Enrollment	1984 Foreign Student Enrollment	Percentage Change 1982 to 1984
Alabama	3,903	4,027	+3.2%
Arkansas	1,640	1,789	+9.1
Kentucky	2,074	1,842	-11.2
Louisiana	8,931	8,963	+0.4
Mississippi	1,564	1,873	+19.8
Tennessee	4,116	4,237	+2.9
Total, Mid-South	22,228	22,731	+2.3
Total, U.S.	336,985	342,110	+1.5

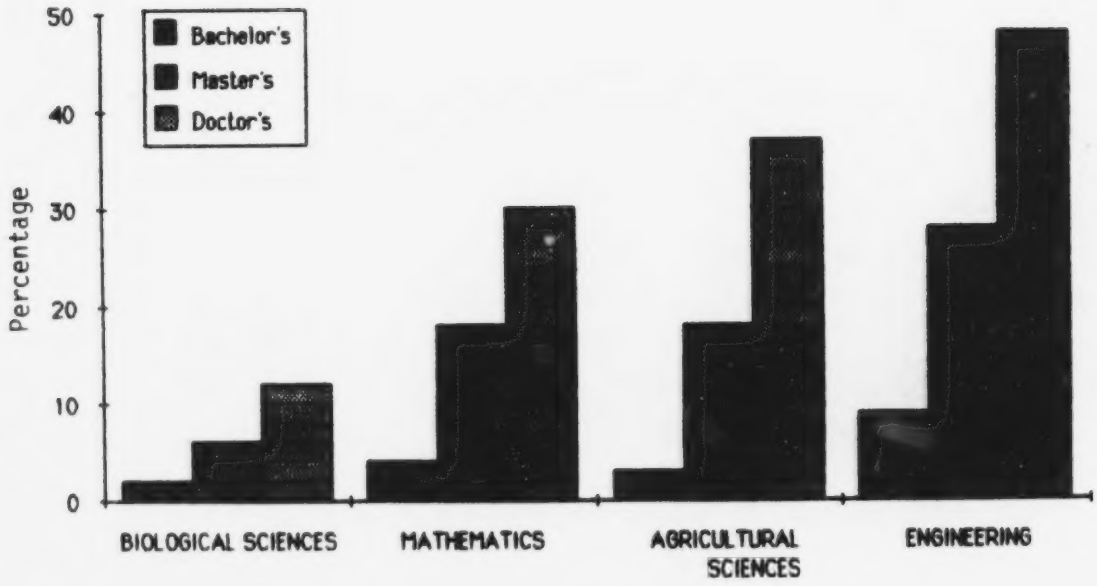
Sources: Based on data from Institute of International Education, as reported in *Open Doors: 1982/83*, 1984, and *The Chronicle of Higher Education*, October 9, 1985.

TABLE 4. FOREIGN STUDENT ENROLLMENT IN THE MID-SOUTH AND IN THE U.S., BY INSTITUTIONAL CHARACTERISTICS, 1982

State	% Enrolled in 2-Year Institutions	% Enrolled in 4-Year Institutions	% Enrolled in Public Institutions	% Enrolled in Private Institutions
Alabama	9.2%	90.8%	75.8%	24.2%
Arkansas	3.7	96.3	83.6	16.4
Kentucky	5.4	94.6	75.2	24.8
Louisiana	5.7	94.3	89.0	11.0
Mississippi	8.9	91.1	85.0	15.0
Tennessee	5.1	94.9	69.7	30.3
Total, Mid-South	6.2	93.8	81.1	18.9
Total, U.S.	14.2	85.8	65.0	35.0

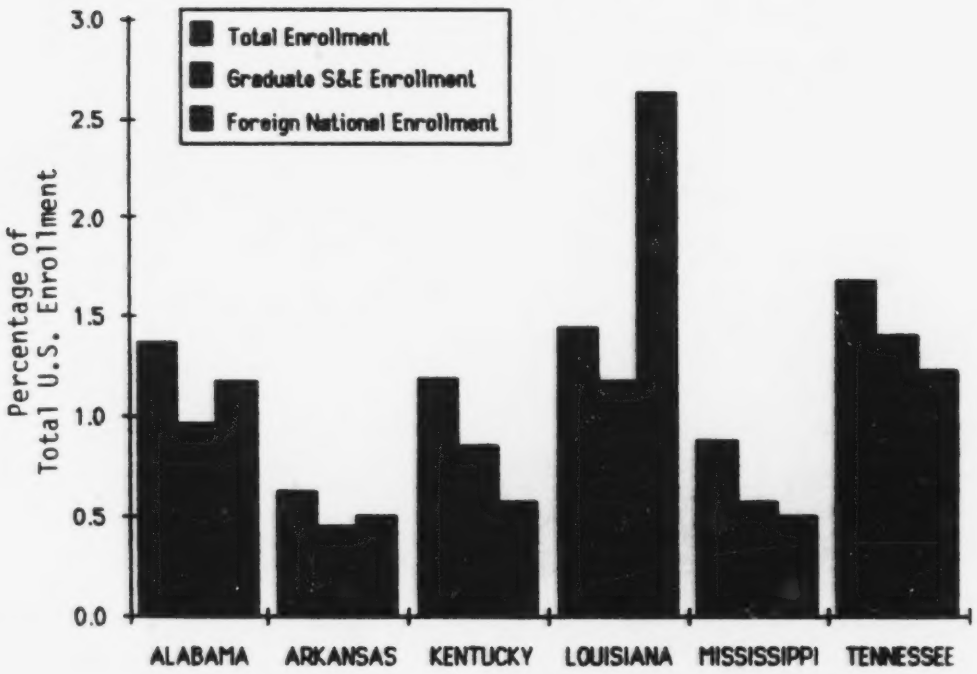
Source: Based on data from Institute of International Education, contained in *Open Doors: 1982/83*, 1984.

FIGURE 1. PERCENTAGE OF U.S. DEGREES AWARDED TO FOREIGN NATIONALS IN SELECTED DISCIPLINES, 1980



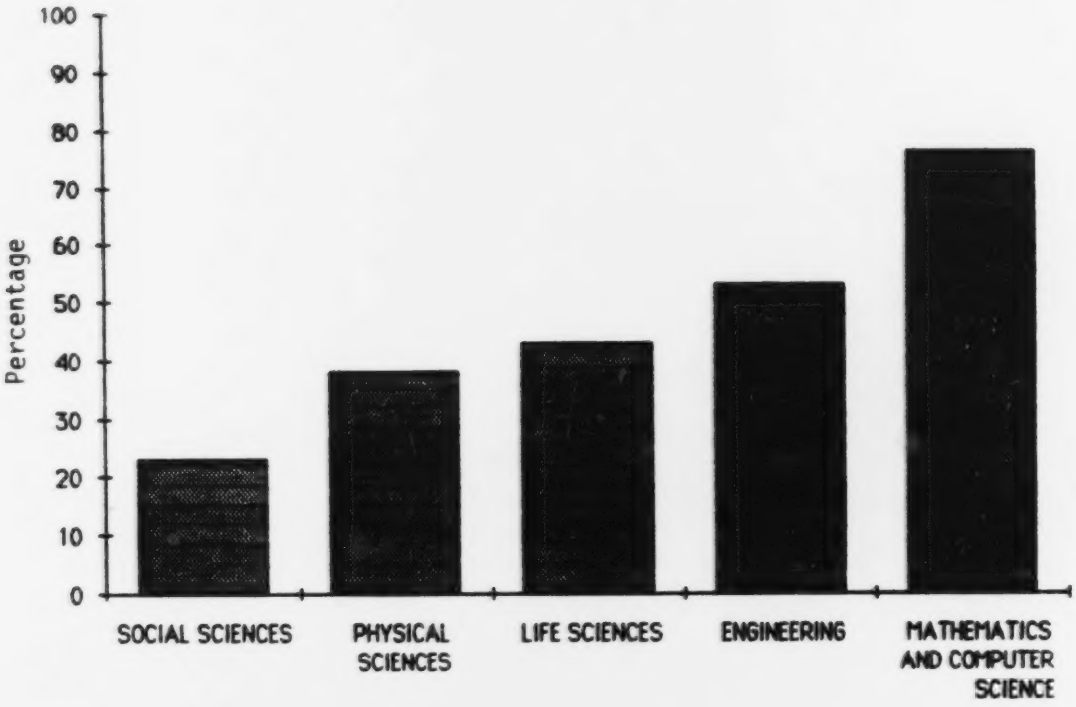
Source: Michael G. Finn, "New Estimates of Immigration of Scientists and Engineers to the U.S.," 1984, pp. 1-2.

FIGURE 2. SELECTED CHARACTERISTICS OF COLLEGE AND UNIVERSITY ENROLLMENTS IN THE MID-SOUTH, 1983



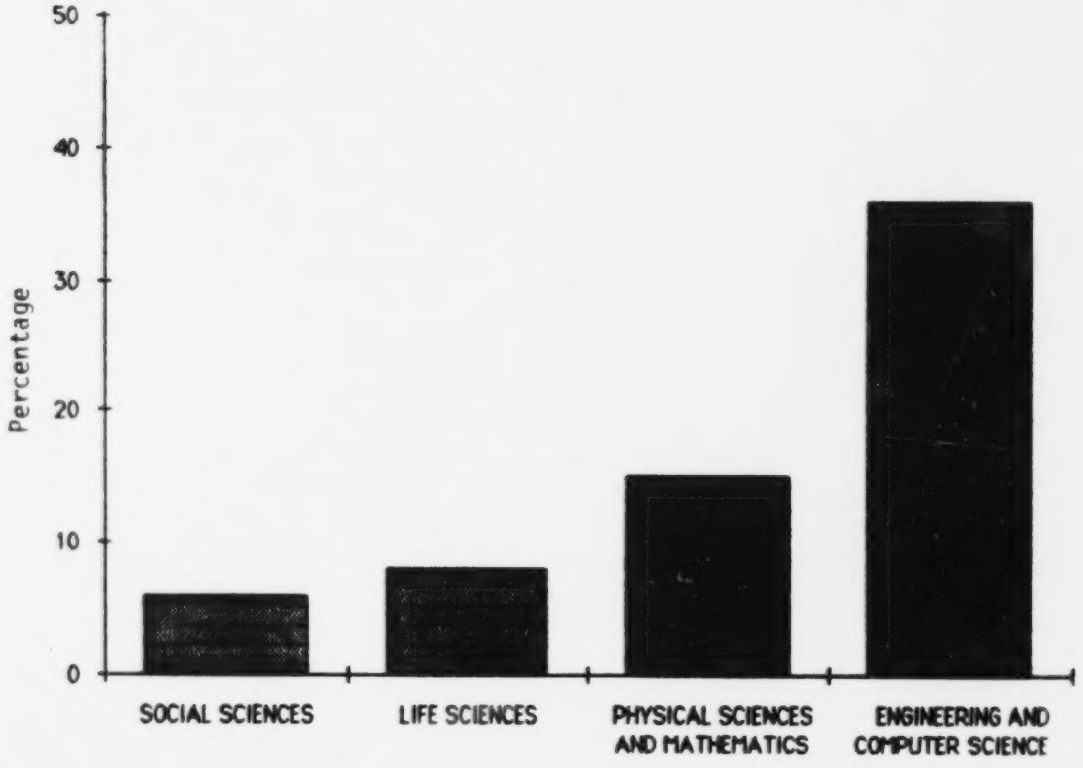
Sources: Estimates based on data from Institute of International Education, as reported in Open Doors: 1982/83, 1984; from National Center for Education Statistics, as reported in The Chronicle of Higher Education, January 23, 1985; and from National Science Foundation, as reported in Academic Science/Engineering: Graduate Enrollment and Support, Fall 1983.

FIGURE 3. PERCENTAGE OF FOREIGN NATIONALS WHO RECEIVED U.S. DEGREES IN SCIENCE AND ENGINEERING DURING 1976-1979 AND WHO WERE IN THE U.S. WORK FORCE IN 1982, SELECTED FIELDS



Source: Michael G. Finn, "New Estimates of Immigration of Scientists and Engineers to the U.S.," 1984, p. 4.

FIGURE 4. FOREIGN NATIONALS AS A PERCENTAGE OF ALL PH.D. NEW ENTRANTS INTO THE U.S. LABOR FORCE, SELECTED DISCIPLINES, 1980-1981



Note: Includes only doctorate recipients from U.S. universities during 1980-1981.

Source: Michael G. Finn, Foreign National Scientists and Engineers in the U.S. Labor Force, 1972-1982, 1985, p. 9.